



Application of Transmission Kikuchi Diffraction in SEM and Some Sample Preparation Challenges

da Silva Fanta, Alice Bastos; Alimadadi, Hossein; Burrows, Andrew

Publication date:
2016

Document Version
Peer reviewed version

[Link back to DTU Orbit](#)

Citation (APA):

da Silva Fanta, A. B., Alimadadi, H., & Burrows, A. (2016). *Application of Transmission Kikuchi Diffraction in SEM and Some Sample Preparation Challenges*. Abstract from SCANDEM 2016, Trondheim, Norway.

General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

Application of Transmission Kikuchi Diffraction in SEM and Some Sample Preparation Challenges

*Alice Bastos Fanta^{*1}, Hossein Alimadadi¹, Andrew Burrows¹*

¹*Technical University of Denmark, Center for Electron Nanoscopy (DTU-Cen), Fysikvej 307, DK 2800, kgs. Lyngby, Denmark*

**E-mail: alice.fanta@cen.dtu.dk*

Keywords: Transmission Kikuchi Diffraction, sample preparation and sample thickness.

Electron Backscatter Diffraction (EBSD) is a well-established technique for automatically obtaining microstructure related crystallographic information in a scanning electron microscope (SEM). Although EBSD has been applied to characterize ultra-fine grained metals, the spatial resolution of the technique has always been a limiting factor for investigation of materials with crystallographic features in the nano-meter range. Recently, Geiss and Keller [1] proposed the use of thin electron transparent specimen placed perpendicular to the standard EBSD sample position to obtain crystallographic information with higher spatial resolution than conventional EBSD in the SEM. This new technique has been termed “transmission electron foreshatter diffraction (t-EFSD)” or “transmission Kikuchi diffraction in the SEM (SEM-TKD)” and is emerging as a very promising technique to characterize materials in the nano-scale.

In this presentation the application of TKD on material systems that are not conventionally investigated by EBSD, such as nanowires and nano-plasmonic discs will be shown. Additionally, application of SEM-TKD to characterize fine microstructure features in metallic materials prepared both by electropolishing as well as by focused ion beam (FIB) will be presented, the importance of sample thickness will be discussed and some challenges in sample preparation will be outlined. Finally, some very recent result of in-situ heat treatment experiments will be presented.

[1] Geiss, R., Keller, R., Sitzman, S., & Rice, P. (2011). New Method of Transmission Electron Diffraction to Characterize Nanomaterials in the SEM. *Microscopy and Microanalysis*, 17(Supplement S2), 386–387.